



The Virginia Fish and Wildlife Information Service

030061 Turtle, bog (= Muhlenberg)

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Report compiled 04 December 2002

Taxonomy [^](#)

Taxonomy for (030061) Turtle, bog (= Muhlenberg) *Clemmys muhlenbergii*

Category 03 Reptiles
Phylum Chordata
SubPhylum Vertebrata
Class Reptilia
SubClass Anapsida
Order Testudines
SubOrder Cryptodira
Family Emydidae
SubFamily Emydinae
Genus Clemmys

SubGenus

Species muhlenbergii

SubSpecies

Authority (Schoepff, 1801)

Taxonomy Comments

No subspecies are recognized *2988,3075*. The specific name muhlenbergii is in honor of the Reverend Goffhild Heinrich Ernst Muhlenberg, an 18th century botanist from Pennsylvania who first found this turtle in his millpond. It was then described as Testudo muhlenbergii by Johann David Schoepff in 1792-1801. Stejneger and Barbour restricted the type locality to Lancaster County, Pennsylvania. The genus Clemmys was first used for this species by Fitzinger in 1835 *10760*.

Taxonomy References

- 3075 Ernst, C.H., R.B. Bury. 1977.us Clemmys muhlenbergi.us (Schoepff). Catalog American amphibians and reptiles:204-1-204-.
- 2988 Ernst, C.H., R.W. Barbour. 1972. Turtles of the United States. Univ. Press of Kentucky, Lexington: 347.
- 10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.

Status

Status for (030061) Turtle, bog (= Muhlenberg) *Clemmys muhlenbergii*

Statu

s

- 102 Federal Threatened
- 201 State Endangered
- 151 CITES Appendix I
- 603 Heritage G3
- 701 Heritage S1
- 999 See Comments

Status Comments

This species was officially listed as endangered by the Virginia Department of Game and Inland Fisheries in 1987 *8895*. Populations are isolated and small, rare in Virginia, with severe threats to the habitat, and highly threatened by overcollecting *9286*. The US Fish & Wildlife Service listed this as a C2 candidate species in September, 1989 *8895*. The US Fish and Wildlife Service began the process to list the northern

population of this species as federal threatened in January, 1997. This process included listing the southern population (Virginia and the southern Appalachians) as federal threatened by Similarity of Appearance *11197*. The special rule exempts incidental take of the southern population of bog turtles. Incidental take is take that results from, but is not the purpose of, carrying out an otherwise lawful activity. For example, legal application of pesticides and fertilizers, livestock grazing and other farming activities, mowing, burning, water diversion, and any other legally undertaken actions that result in the accidental take of a bog turtle will not be considered a violation of section 9 of the Endangered Species Act in the southern states of Georgia, North Carolina, South Carolina, Tennessee and Virginia. The service does not consider the southern population of bog turtles to be biologically threatened or endangered and believes that listing the southern population under the similarity of appearance provision of the Act, coupled with the special rule, minimizes enforcement problems and helps to conserve the northern population. It is the intent of the rule to treat bog turtles from the southern population in the same way as the threatened northern population with regard to permit requirements for pre-Act wildlife (50 CFR 17.4) or captive bred wildlife (50 CFR 17.21(g)) *11200*. As of November 4, 1997, the southern population of the bog turtle was listed as federal threatened by similarity of appearance with the northern population, which was listed as federal threatened. The Virginia population of this species is part of the southern population *11279*. Several populations occur on NPS property, but most occur on private lands. Conservation efforts must include a 3-pronged approach. These are (1) the accumulation of critical data on population ecology and demography (e.g., home range size, movements, population structure, survivorship, recruitment rate), the education of private landowners in the range of this turtle, and the protection of the wetlands used by this species.*10760* This little turtle is a reptile pet fancier's prize. Several individuals are poached every year or two despite the legal protection placed on this species in nearly every state in which it lives. Because bog turtles are small, colorful, generally easy to keep, and respond well to behavioral conditioning, it is easy to imagine why they are sought after.*10760* Linzey and Hoffman pointed out the uniqueness of the biogeographical area in Carroll, Floyd, and Grayson Counties because of which species are found there and which are not. The bog turtle is one member of a unique biological assemblage existing on the southern Blue Ridge Plateau *10120*.

Status References

- 10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.
- 10824 Mitchell, J. C., K. A. Buhlmann. 1991. Distribution and Status of the Endangered Bog Turtle (*Clemmys muhlenbergii*) on the Blue Ridge Parkway in Virginia. National Park Service, Asheville, North Carolina: 55.
- 8895 Mitchell, J. C., Pague, C. A. 1987. A review of reptiles of special concern in Virginia. Va. Jour. Sci. 38(4):319-328.
- 10809 Mitchell, J.C., C.A. Pague. 1987. A review of reptiles of special concern in Virginia. Virginia Journal of Science 38(4):319-328.

- 11048 Roble, S. M. 1996. Natural Heritage resources of Virginia: Rare animal species. Natural Heritage technical report 96-11. DCR, Division of Natural Heritage, Richmond, VA: 25.
- 10120 Terwilliger, K. 1991. Virginia's endangered species: Proceedings of a symposium.: 672.
- 9286 Terwilliger, K.T. 1991. Virginia's endangered species: Proceedings of a symposium. Coordinated by the Virginia Dept. of Game and Inland Fisheries, Nongame and Endangered Species Program. McDonald and Woodward Publ. Comp., Blacksburg, VA: 672 pp.
- 11286 U.S. Fish and Wildlife Service. 1975. CITES - Convention on International Trade in Endangered Species of Wild Fauna and Flora - CFR 50 Part 23. U.S. Gov't Printing Office, Washington, DC.
- 11200 U.S. Fish and Wildlife Service. 1997. Endangered and threatened wildlife and plants; Proposed rule to list the northern population of the bog turtle as threatened and the southern population as threatened due to similarity of appearance, Federal Register 50 CFR Part 17. 62(19). U.S. Government Printing Office, Washington, DC:4229-4239.
- 11279 U.S. Fish and Wildlife Service. 1997. Federal Register, November 4, 1997, Final rule listing the northern population of the bog turtle as threatened and the southern population as threatened by similarity of appearance, 50 CFR Part 17. Federal Register 62(213). U.S. Gov't Printing Office, Washington, DC:59605-59623.
- 11197 U.S. Fish and Wildlife Service. 1997. U.S. Fish and Wildlife Service proposes Endangered Species Act protection for bog turtle - Northeast Region press release mailed to public officials in Virginia.: 11 pp.

Life History

Life History for (030061) Turtle, bog (= Muhlenberg) *Clemmys muhlenbergii*

Life History Comments

PHYSICAL DESCRIPTION: This is a small freshwater turtle that has a maximum carapace length of 115 mm (4.5 inches), and an average of 80-105 mm. The plastron length is from 71-92 mm. In Va., max known carapace length is 102 mm, maximum plastron length is 89 mm, and max body weight is 132 grams. The surface of the carapace is roughened with growth annuli, black to brown sometimes with irregular markings, and a smooth posterior rim. The keel is low in juveniles but often worn smooth with age. The centers of the pleural scutes may be lighter than the surrounding area. The marginals and bridge are colored like the carapace; 12/12 marginals, 4/4 pleurals, 5 vertebrals. The hingeless plastron is usually black with irregularly-shaped blotches of yellow to cream along the midline. The skin on the head, neck, and limbs is brown to pink, possibly with red mottling on the limbs. A large, conspicuous, orange, yellow, or red blotch lies behind

each eye. The adult males have a concave plastron and an elongate tail base that places the anal opening beyond the carapacial margin (avg. precloacal distance = 24.8+/-5.0 mm, 16-31, n=12). The adult females have a flattened plastron, a higher and wider carapace, and a shorter tail (avg. precloacal distance = 14.4+/-3.5 mm, 11-18, n=5). The adult males can grow up to 105 mm or more in carapace length, and the adult females seldom grow larger than 100 mm. Virginia males are 70.2-101.7 mm carapace length (avg.=91.3+/-8.0, n=17), 63-88.7 mm plastron length, (avg. = 79.0+/-6.2, n=17), and weigh 54-132 grams (avg. = 106.1+/- 25.0, n=12). Females are 72.3-102.0 mm carapace length (avg. =87.3+/-7.5, n=15), 66.8-87.8 mm plastron length (avg.=108.2+/-19.7, n=11). Sexual dimorphism index based on carapace length is 1.05 *10760*. The juveniles have a slightly different pattern than adults. The carapace is more cylindrical and is brown, and the plastron is yellow with a large dark blotch in the center. The patch behind the eye is present at hatching. Hatchlings from Virginia were 27.7-28.5 mm carapace length (avg. = 28.1, n=3) *10760*. **REPRODUCTION:** This species is sexually mature at 6 years of age. It breeds from late April-early June, in shallow water or on land. During mating the male clings tightly to the edge of the female's carapace and juxtaposes his tail beneath hers. There is no shell pounding. There may be two clutches a year of 3-5 eggs/clutch. Incubation takes 50-59 days. They average 30 X 16 mm. Shallow nests are dug in grassy or mossy areas or where there are soft soils. There may not be a formal nest dug, but instead the eggs are layed in the top of sedge tussocks. Most hatching occurs in August, but the young in some nests do not emerge until early October or the following April or May. The size at maturity is 70 mm plastron length *9286*. **BEHAVIOR:** This species is active only during April, May, June and September and aestivates during high temperature. In the late spring, and late summer, they are active during the day only *2988,3072,3071,3076*. Activity shifts from midday and afternoon in early spring to morning in late spring and summer. The median home range size is between .06-.35 ha *11394*. Dispersion is random. They range over 3 acres or .0047 square miles *3074*. Basking occurs during the midday usually on grass mats or shallow rivulets. The body temperatures of basking turtles in PA were measured at 22.0-31.0 degrees C *10760*. More activity occurs during cloudy days than on bright sunny days. Bog turtles are basically omnivores and have been known to eat the following: a variety of insects (including beetles), earthworms, slugs, snails, millipedes, crayfish, tadpoles, duckweed, seeds of pondweed (*Potamogeton* sp.) and sedges (*Carex* sp.), blackberries and strawberries *10760,11613*. This species is non-territorial *9286*. When spooked a bog turtle may dive head first into the soft mud *10760*. **ORIGIN:** The origin of this species is native *2988*. **POPULATION PARAMETERS:** Most populations are composed predominately of adults, although the juveniles are very secretive. The adult sex ratio is usually 1:1. Growth rates decline with age and adults grew 1.7-4.0 mm per year *9286,10760*. The population size seems always to be small, usually 50-150 individuals site. **AQUATIC/TERRESTRIAL ASSOCIATIONS:** Outside Virginia, this species is associated with *Clemmys guttata* and *C. insculpta* *2988,3071,3076,11613*. Alder (*Alnus serrulata*), skunk cabbage (*Symplocarpus foetidus*), and sedges (*Carex* sp.) are common plant associates. This species is preyed on by raccoons, skunks, opossum, dogs, and some wading birds. Adults are often found with missing toes and limbs, stubbed tails, and gnawed shells *9286,11613*. Bog turtles often burrow into mud or hide in grass tussocks. Their habitat is one of the last stages of wetlands succession, so turtles must

eventually move to other sites or perish as drying occurs *3075*. Bog turtles are among the most valued North American reptiles in the pet trade and overcollecting has diminished populations. Habitat loss due to drainage of freshwater marsh areas is the most serious threat to the isolated populations *9286,11613*.

Life History References

- 3071 Arndt, R.G. 1977. Notes on the natural history of the bog turtle.us *Clemmys muhlenbergi*.us (Schoepff), in Delaware. Chesapeake Sci. 18(1):67-76.
- 3072 Barton, A.J., J.W. Price. 1955. Our knowledge of the bog turtle.us *Clemmys muhlenbergi*.us surveyed and documented. Copeia 1955(3):159-165.
- 11394 Carter, Shawn L., Carola A. Haas, Joseph C. Mitchell. 1999. Home Range and Habitat Selection of Bog Turtles in Southwestern Virginia. J. of Wildl. Manage. 63(3):853-860.
- 3074 Ernst, C.H. 1977. Biological notes on the bog turtle. Herpetological 33(2):241-246.
- 3075 Ernst, C.H., R.B. Bury. 1977.us *Clemmys muhlenbergi*.us (Schoepff). Catalog American amphibians and reptiles:204-1-204-.
- 2988 Ernst, C.H., R.W. Barbour. 1972. Turtles of the United States. Univ. Press of Kentucky, Lexington: 347.
- 1012 Gourley, E.V. 1979. Bog turtle from the Proceedings of the Symposium on Endangered and Threatened Plants and Animals of Virginia. Linzey, D.W. Ext. Div., VA Tech, Blacksburg, VA:405-406, 665 pp.
- 3076 Holub, R.J. 1977. The bog turtle.us *Clemmys muhlenbergi*.us - a natural history. Herpetol. Bull. New York Soc. 13(3):9-23.
- 10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.
- 11613 Pinder, M. 2001. Personal Communication, Expert Review for GAP Analysis Project. , Va. Dept. of Game & Inland Fisheries.
- 9286 Terwilliger, K.T. 1991. Virginia's endangered species: Proceedings of a symposium. Coordinated by the Virginia Dept. of Game and Inland Fisheries, Nongame and Endangered Species Program. McDonald and Woodward Publ. Comp., Blacksburg, VA: 672 pp.

County Distribution Map [^](#)

Commonwealth of Virginia

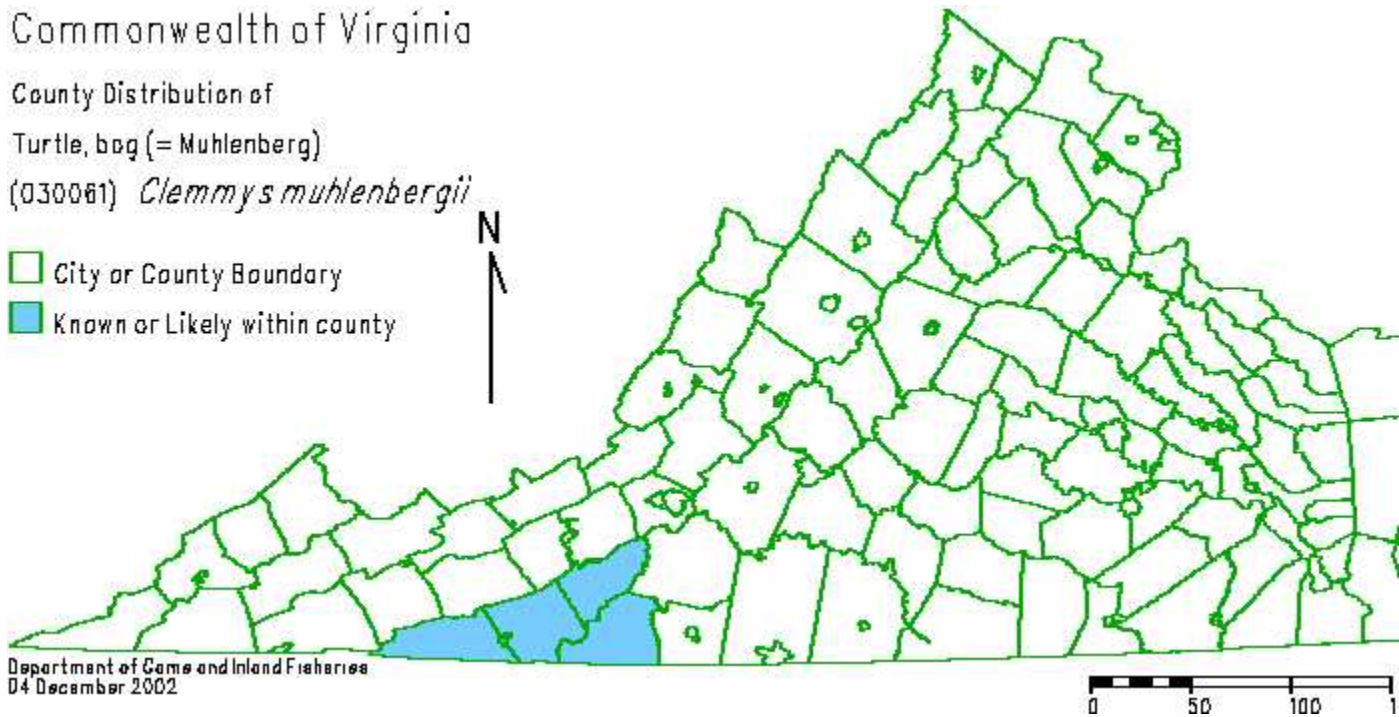
County Distribution of

Turtle, bog (= Muhlenberg)

(030061) *Clemmys muhlenbergii*

City or County Boundary

Known or Likely within county



County Distribution [^](#)

County Distribution for (030061) Turtle, bog (= Muhlenberg) *Clemmys muhlenbergii*

General Occurrence City/County References

1 Known	035 Carroll	11332,10760,10949
1 Known	063 Floyd	11332,10760,10949
1 Known	077 Grayson	11332,10760,10949
1 Known	141 Patrick	11332,10760,10949
2 Likely	640 Galax	10760

General Occurrence Comments

They are found in Virginia only in the southern Blue Ridge Plateau *9286*. A Montgomery County specimen was observed and released on the VA Tech farm west of Blacksburg. It may have been introduced *8800*. There is an erroneous, historical record of a bog turtle from Fairfax Co., Va *10760*.

General Occurrence References

10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press,

Washington, DC: 352.

11332 Mitchell, Joseph C. and Karen K. Reay. 1999. Atlas of Amphibians and Reptiles in Virginia. (1). Virginia Department of Game and Inland Fisheries, Richmond, VA: 122.

10949 Virginia Department of Game and Inland Fisheries. 1995. Collections database.

Resident Occurrence City/County References

1 Known	035 Carroll	11332,10760,10949
1 Known	063 Floyd	11332,10760,10949
1 Known	077 Grayson	11332,10760,10949
1 Known	141 Patrick	11332,10760,10949

Resident Occurrence Comments

This species is found in Virginia only in the southern Blue Ridge Plateau *9286*. A Montgomery County specimen was observed and released on the Va Tech farm, west of Blacksburg. It may have been introduced *8800*. There is an erroneous, historical record of a bog turtle from Fairfax Co., Va *10760*.

Resident Occurrence References

10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.

11332 Mitchell, Joseph C. and Karen K. Reay. 1999. Atlas of Amphibians and Reptiles in Virginia. (1). Virginia Department of Game and Inland Fisheries, Richmond, VA: 122.

10949 Virginia Department of Game and Inland Fisheries. 1995. Collections database.

Seasonal Occurrence City/County References

O Year-round	035 Carroll	11332,10760,10949
O Year-round	063 Floyd	11332,10760,10949
O Year-round	077 Grayson	11332,10760,10949
O Year-round	141 Patrick	11332,10760,10949
O Year-round		

Seasonal Occurrence Comments

Seasonal distribution of 172 individual records from VA. are: March (0 April (2.9%), May (62.2%), June (21.5%), July (5.2%), August (0.05%), September (6.9%). The earliest observation was on 5 March and the late on 29 September. During July and August, bog turtles apparently aestivate in soft mud. In winter, they hibernate in muskrat burrows, sedge clumps, and mud of waterways *10760*.

Seasonal Occurrence References

- 10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.
- 11332 Mitchell, Joseph C. and Karen K. Reay. 1999. Atlas of Amphibians and Reptiles in Virginia. (1). Virginia Department of Game and Inland Fisheries, Richmond, VA: 122.
- 10949 Virginia Department of Game and Inland Fisheries. 1995. Collections database.

County Distribution for (030061) Turtle, bog (= Muhlenberg) *Clemmys muhlenbergii*

Other Distribution [^](#)

Other Distribution for (030061) Turtle, bog (= Muhlenberg) *Clemmys muhlenbergii*

USFWS Refuges - Not available

USFWS Refuge References - Not available

NPS Park and Recreation Areas

601 Blue Ridge Parkway

NPS Parks and Recreation Area References

- 1012 Gourley, E.V. 1979. Bog turtle from the Proceedings of the Symposium on Endangered and Threatened Plants and Animals of Virginia. Linzey, D.W. Ext. Div., VA Tech, Blacksburg, VA:405-406, 665 pp.
- 10824 Mitchell, J. C., K. A. Buhlmann. 1991. Distribution and Status of the Endangered Bog Turtle (*Clemmys muhlenbergii*) on the Blue Ridge Parkway in Virginia. National Park Service, Asheville, North Carolina: 55.

USFS Ranger Districts

081404 Mt. Rogers

USFS Ranger District References

10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.

VDGIF Wildlife Management Areas

025 Fairystone 033 Stewart's Creek

VDGIF Wildlife Management Area References

10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.

Administrative Units Comments

Occurrences for Parks, Refuges, Ranger Districts, and Wildlife Management Areas are based on known or likely county distribution except for the following documented known areas: Blue Ridge Parkway *10824*.

USGS Topographic Quadrangles

2704 Alum Ridge	2401 Lambsburg
2905 Check	2602 Laurel Fork
2301 Cumberland Knob	2702 Meadows of Dan
2603 Dugspur	2802 Stuart
2904 Endicott	2703 Willis
2502 Fancy Gap	2402 Woodlawn
2804 Floyd	2803 Woolwine

USGS Topographic Quadrangle References

10949 Virginia Department of Game and Inland Fisheries. 1995. Collections database.

USGS Hydrologic Units

03010103 South Atlantic-Gulf Region: Upper Dan River

03040101 South Atlantic-Gulf Region: Upper Yadkin River
05050001 Ohio Region: Upper New River

USGS Hydrologic Unit References

- 10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.
- 11332 Mitchell, Joseph C. and Karen K. Reay. 1999. Atlas of Amphibians and Reptiles in Virginia. (1). Virginia Department of Game and Inland Fisheries, Richmond, VA: 122.
- 10949 Virginia Department of Game and Inland Fisheries. 1995. Collections database.

Ecoregions

- 221416 Appalachian Oak Forest: Low Mountains
- 232007 Southeastern Mixed Forest: Low Mountains

Ecoregion References

- 10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.
- 11332 Mitchell, Joseph C. and Karen K. Reay. 1999. Atlas of Amphibians and Reptiles in Virginia. (1). Virginia Department of Game and Inland Fisheries, Richmond, VA: 122.
- 10949 Virginia Department of Game and Inland Fisheries. 1995. Collections database.

Physiographic Provinces

- 3 Blue Ridge

Physiographic Province References

- 10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.

Site Distribution Comments - Not available

General Distribution Comments

They are found in Virginia only in the southern Blue Ridge Plateau in Carroll, Floyd, and Grayson counties *9286,10824*. There is an erroneous, historical record of a bog turtle from Fairfax Co., VA *10760*. They are found in the southeastern Valley and Ridge Physiographic Region *10809*.

County Abundance [^](#)

County Abundance for (030061) Turtle, bog (= Muhlenberg) *Clemmys muhlenbergii*

Relative Distribution Within County City/County - Not available

Distribution Within County Comments - Not available

Distribution Within County References - Not available

Relative Abundance within County City/County - Not available

Relative Abundance Within County Comments - Not available

Relative Abundance Within County References - Not available

Average Annual Population for Last 5 Years City/County - Not available

Average Annual Population for Last 5 Years Comments - Not available

Average Annual Population for Last 5 Years References - Not available

Average Annual Harvest for Last 5 Years City/County - Not available

Average Annual Harvest for Last 5 Years Comments - Not available

Average Annual Harvest for Last 5 Years References - Not available

Management Practices [^](#)

Management Practices for (030061) Turtle, bog (= Muhlenberg) *Clemmys muhlenbergii*

B Beneficial 007 Predator control

B Beneficial 008 Restricting/regulating human use of habitats

B Beneficial 009 Restricting/regulating human disturbance of populations

Beneficial Management References

- 1012 Gourley, E.V. 1979. Bog turtle from the Proceedings of the Symposium on Endangered and Threatened Plants and Animals of Virginia. Linzey, D.W. Ext. Div., VA Tech, Blacksburg, VA:405-406, 665 pp.
- 10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.
- 10824 Mitchell, J. C., K. A. Buhlmann. 1991. Distribution and Status of the Endangered Bog Turtle (*Clemmys muhlenbergii*) on the Blue Ridge Parkway in Virginia. National Park Service, Asheville, North Carolina: 55.
- 8895 Mitchell, J. C., Pague, C. A. 1987. A review of reptiles of special concern in Virginia. Va. Jour. Sci. 38(4):319-328.
- 11613 Pinder, M. 2001. Personal Communication, Expert Review for GAP Analysis Project. , Va. Dept. of Game & Inland Fisheries.
- 3068 Shiffer, C.N. 1980. Personal communication. Herp. and endangered species coordinator. Pennsylvania Fish Commission, Bellefonte.
- 9286 Terwilliger, K.T. 1991. Virginia's endangered species: Proceedings of a symposium. Coordinated by the Virginia Dept. of Game and Inland Fisheries, Nongame and Endangered Species Program. McDonald and Woodward Publ. Comp., Blacksburg, VA: 672 pp.
- 3081 Zappalorti, R.T. 1976. The amateur zoologist's guide to turtles and crocodilians. Stackpole Books, Harrisburg, Pa: 208.

Adverse Management References

- 2988 Ernst, C.H., R.W. Barbour. 1972. Turtles of the United States. Univ. Press of Kentucky, Lexington: 347.
- 10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.
- 10824 Mitchell, J. C., K. A. Buhlmann. 1991. Distribution and Status of the Endangered Bog Turtle (*Clemmys muhlenbergii*) on the Blue Ridge Parkway in Virginia. National Park Service, Asheville, North Carolina: 55.
- 8895 Mitchell, J. C., Pague, C. A. 1987. A review of reptiles of special concern in Virginia. Va. Jour. Sci. 38(4):319-328.
- 11613 Pinder, M. 2001. Personal Communication, Expert Review for GAP Analysis Project. , Va. Dept. of Game & Inland Fisheries.
- 3068 Shiffer, C.N. 1980. Personal communication. Herp. and endangered species

coordinator. Pennsylvania Fish Commission, Bellefonte.

- 9286 Terwilliger, K.T. 1991. Virginia's endangered species: Proceedings of a symposium. Coordinated by the Virginia Dept. of Game and Inland Fisheries, Nongame and Endangered Species Program. McDonald and Woodward Publ. Comp., Blacksburg, VA: 672 pp.
- 3081 Zappalorti, R.T. 1976. The amateur zoologist's guide to turtles and crocodilians. Stackpole Books, Harrisburg, Pa: 208.

Existing Management References - Not available

Management Comments

It is beneficial to maintain and preserve habitat. Habitat reclamation and reintroduction are possibilities *3068*. The greatest threat is habitat loss caused by manmade lakes and the draining and filling of wetland *3081,10824*. Limit the number of roads and road usage and maintain early stages of succession *3068,3081,10824*. Adverse to this species are industrial pollution maintaining mature hardwood forests, intensive recreational development, urban or agrarian development and the creation of suburban residential areas *2988,3068, 3081*. There is an immediate need to conduct a complete distributional survey to determine locations of populations. This species may be more secretive than rare. *9286*. Conservation efforts must include a 3-pronged approach. These are (1) the accumulation of critical data on population ecology and demography (e.g., home range size, movements, population structure, survivorship, recruitment rate), the education of private landowners in the range of this turtle, and the protection of the wetlands used by this species.*10760* Bog turtles are found in mountain spring-fed wetlands characterized by open fields or meadows with slow moving streams, ditches, and boggy areas. Alder (*Alnus serrulata*), skunk cabbage (*Symplocarpus foetidus*), and sedges (*Carex* spp.) are common plant associates. Grasses that are dead and matted in winter and early spring form a dense ground cover during late spring and summer. Consequently, bog turtles are usually seen only in early spring and during nesting season *10760,11613*. Nothing is known of the prey of bog turtles in Va. Elsewhere in their range, they are omnivores. Bog turtles eat in or out of the water. Known prey include a variety of insects, earthworms, slugs, snails, millipedes, crayfish, tadpoles, duckweed (*Lemna*), watercress (*Barbarea*), skunk cabbage, blackberries (*Rubus*), strawberries (*Fragaria*), and seeds of pondweed (*Potamogeton*), and sedges (*Carex*). Carrion, dead frogs, and insects are sometimes eaten. Predators of eggs, juveniles and adults are raccoons, skunks, opossum, dogs, foxes, and some wading birds. Several individuals are killed by vehicles on roads each year. Adults are sometimes found with missing limbs and gnawed shells.*10760* A beneficial practice for this species would include control of the following predators: raccoons, opossums, skunks, dogs, and cats *11613*. Among some of the adverse practices for this species, channelization as in ditching is adverse. Also, haying and mowing are adverse if they are done intensively *11613*.

Food Habits [^](#)

Food Habits for (030061) Turtle, bog (= Muhlenberg)*Clemmys muhlenbergii*

Trophic Omnivore
Trophic References

- 2988 Ernst, C.H., R.W. Barbour. 1972. Turtles of the United States. Univ. Press of Kentucky, Lexington: 347.
- 3079 Nemuras, K.T., Weaver, J.A. 1974. The bog turtle. Pennsylvania Angler (73):15-18.

Food Utilized by Life Stage

Lifestage	Food	Part
G General 9999	See Comments on Food Habits	S See Comments
G General 2000	Tracheophyta (Vascular Plants)	X Not Specified
G General 2500	Angiospermae	X Not Specified
G General 3400	Monocotyledoneae	X Not Specified
G General 3530	Poaceae	X Not Specified
G General 6000	Molluscs	X Not Specified
G General 6030	Snails	X Not Specified
G General 6700	Insects	X Not Specified
G General 5800	Annelids	X Not Specified
G General 6600	Crustaceans	X Not Specified
G General 6300	Diplopods	X Not Specified
G General 7600	Amphibia	R Egg/Fetus stage

Food (General) Comments

This species eats berries, insects and dead animals *1012,3071,3076*. Known prey includes a variety of insects, earthworms, slugs, snails, millipedes, crayfish, tadpoles, duckweed, seeds of pondweed (Potamogeton) and sedges (Carex), and blackberries and strawberries *9286,10760*.

Food (General) References

- 10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.

9286 Terwilliger, K.T. 1991. Virginia's endangered species: Proceedings of a symposium. Coordinated by the Virginia Dept. of Game and Inland Fisheries, Nongame and Endangered Species Program. McDonald and Woodward Publ. Comp., Blacksburg, VA: 672 pp.

Food (Important) References - Not available

Food (Adults) Comments

Nothing is known of the prey of bog turtles in Va. Elsewhere in their range, they are omnivores. Bog turtles eat in or out of the water. Known prey include a variety of insects, earthworms, slugs, snails, millipedes, crayfish, tadpoles, duckweed (Lemma), watercress (Barbarea), skunk cabbage, blackberries (Rubus), strawberries (Fragaria), and seeds of pondweed (Potamogeton), and sedges (Carex). Carrion, dead frogs, and insects are sometimes eaten.*10760*

Food (Adult) References - Not available

Food (Juvenile) Comments - Not available

Food (Juvenile) References - Not available

Food (Larval) Comments - Not available

Food (Larvel) References - Not available

Habitat Associations [^](#)

Habitat for (030061) Turtle, bog (= Muhlenberg) *Clemmys muhlenbergii*

Habitat Riparian Terrestrial

Habitat References

- 1012 Gourley, E.V. 1979. Bog turtle from the Proceedings of the Symposium on Endangered and Threatened Plants and Animals of Virginia. Linzey, D.W. Ext. Div., VA Tech, Blacksburg, VA:405-406, 665 pp.
- 10824 Mitchell, J. C., K. A. Buhlmann. 1991. Distribution and Status of the Endangered Bog Turtle (*Clemmys muhlenbergii*) on the Blue Ridge Parkway in Virginia. National Park Service, Asheville, North Carolina: 55.
- 11613 Pinder, M. 2001. Personal Communication, Expert Review for GAP Analysis Project. , Va. Dept. of Game & Inland Fisheries.

- 9286 Terwilliger, K.T. 1991. Virginia's endangered species: Proceedings of a symposium. Coordinated by the Virginia Dept. of Game and Inland Fisheries, Nongame and Endangered Species Program. McDonald and Woodward Publ. Comp., Blacksburg, VA: 672 pp.
- 11349 Weigl, Peter D., Steele, Michael A., Sherman, Lori J., Ha, James c., Sharpe, Terry C. 1988. The Ecology of the Fox Squirrel (*Sciurus niger*) in North Carolina: Implications for Survival in the Southeast.: 133.

Forest Size Class - Not available

Forest Size References - Not available

SAF Type - Not available

SAF Type References - Not available

Land Use

50 Water

51 Streams and Canals

60 Wetland

61 Forested Wetland

62 Nonforested Wetland

Land Use References

- 10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.

USFWS National Wetland Inventory

P0 Palustrine

EM2 Emergent, nonpersistent

P0 Palustrine

EM1 Emergent, persistent

P0 Palustrine

UB3 Unconsolidated bottom, mud

P0 Palustrine

US3 Unconsolidated Shore, mud

P0

Palustrine

UB4 Unconsolidated bottom, organic

USFWS National Wetland Inventory References

11394 Carter, Shawn L., Carola A. Haas, Joseph C. Mitchell. 1999. Home Range and Habitat Selection of Bog Turtles in Southwestern Virginia. J. of Wildl. Manage. 63(3):853-860.

10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.

Habitat Association

Home range is similar between sexes and ranges between 0.06-0.35 ha. This home range size stays consistent through life but the home range location changes due to microhabitat availability *11394*. This species is found primarily in sphagnum bogs or wet sedge meadows in or near slow moving streams, with a muddy bottom above 610 meters elevation. The highest populations occur in shrub stage of forest succession. The median light intensity was lower at bog turtles sights implicating a denser canopy at turtle locations. The median water depth was 9.4 cm and median vegetation depth was 25 cm *11349*. Adult turtles select home range sites closer to deeper mud and water than would be expected randomly *11349*. Most Virginia records are in the southern Blue Ridge Province *1012*. They are found in freshwater wetlands characterized by open fields, meadows, or marshes with slow-moving, mountain spring-fed streams, ditches, and boggy areas. Alder, skunk cabbage, and sedges are common plant associations. They are usually seen only during the early spring and during the nesting season because the dead and matted grasses and sedges form a dense ground cover during late spring and summer. They often aestivate in the soft mud to escape the heat. During the winter they hibernate below the frost depth in holes, muskrat burrows, in sedge clumps, or in the mud of waterways. Outside Virginia, they use streams as dispersal corridors *10824,11613,9286*. In a study of habitat preferences in southwest Va there was no significant statistical difference between wet meadow, bulrush=alder edge, alder edge, bulrush edge, dry meadow and stream.

Animal or Plant Associations

bog turtle/insects: predation bog turtle/earthworms: predation bog turtle/slugs: predation bog turtle/snails: predation bog turtle/millipedes: predation bog turtle/crayfish: predation bog turtle/tadpoles: predation bog turtle/duckweed: herbivory bog turtle/watercress: herbivory bog turtle/skunk cabbage: herbivory bog turtle/blackberries: herbivory bog turtle/strawberries: herbivory bog turtle/pondweed seeds: herbivory bog turtle/sedges: herbivory

Animal or Plant Association Comments

Predators include raccoons, skunks, opossum, dogs, foxes, and some wading birds

9286.

Animal or Plant Association References

10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.

USFWS Habitat Evaluation Procedures - Not available

USFWS Habitat Evaluation Procedure Comments - Not available

USFWS Habitat Evaluation Procedure References - Not available

Potential Natural Vegetation

095 Appalachian Oak Forest

097 Northern Hardwoods

101 Oak-Hickory-Pine Forest

Potential Natural Vegetation References

10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.

11332 Mitchell, Joseph C. and Karen K. Reay. 1999. Atlas of Amphibians and Reptiles in Virginia. (1). Virginia Department of Game and Inland Fisheries, Richmond, VA: 122.

10949 Virginia Department of Game and Inland Fisheries. 1995. Collections database.

Environmental Association by Lifestage [^](#)

Lifestage Environmental Associations for (030061) Turtle, bog (= Muhlenberg) *Clemmys muhlenbergii*

General 00300G Elevation: 2000-3000 ft.

General 00360E Soil Drainage: Very poorly drained

General 00390A Soil Moisture: Wet

General 00410C Terrestrial Features: Burrows

General 00440C Inland Wetlands: Inland shallow fresh marshes

General 00440H Inland Wetlands: Bogs

General 00610T Shrubs: Alder

Environmental Associations Comments

They are found in the shrub stage of forest succession in upland freshwater wetlands characterized by open fields, meadows, or marshes with slow moving streams, ditches, and boggy areas. Alder (*Alnus serrulata*), skunk cabbage (*Symplocarpus foetidus*), bulrushes (*Scirpus* sp.), and sedges (*Carex* sp.) are common plant associates. In July and August, they often aestivate in the soft mud to escape the heat. They bask on grass mats or in shallow rivulets *9286,11613*. In winter, they hibernate in muskrat burrows, sedge clumps, or the mud of waterways.*10760*

Environmental Associations References

- 11394 Carter, Shawn L., Carola A. Haas, Joseph C. Mitchell. 1999. Home Range and Habitat Selection of Bog Turtles in Southwestern Virginia. *J. of Wildl. Manage.* 63(3):853-860.
- 1012 Gourley, E.V. 1979. Bog turtle from the Proceedings of the Symposium on Endangered and Threatened Plants and Animals of Virginia. Linzey, D.W. Ext. Div., VA Tech, Blacksburg, VA:405-406, 665 pp.
- 10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.
- 11613 Pinder, M. 2001. Personal Communication, Expert Review for GAP Analysis Project. , Va. Dept. of Game & Inland Fisheries.
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Environmental Associations (Limiting) References - Not available

Environmental Associations (Feeding Adults) Comments - Not available

Environmental Associations (Feeding Adults) References - Not available

Environmental Associations (Resting Adults) Comments - Not available

Environmental Associations (Resting Adults) References

- 10760 Mitchell, J. C. 1994. The reptiles of Virginia. Smithsonian Institution Press, Washington, DC: 352.

Environmental Associations (Breeding Adults) Comments

The shallow nests are in grass tussocks, moss or soft soils *9286*.

Environmental Associations (Breeding Adults) References - Not available

Environmental Associations (Feeding Juvenile) Comments - Not available

Environmental Associations (Feeding Juvenile) References - Not available

Environmental Associations (Resting Juvenile) Comments - Not available

Environmental Associations (Resting Juvenile) References - Not available

Environmental Associations (Feeding Larvae) Comments - Not available

Environmental Associations (Feeding Larvae) References - Not available

Environmental Associations (Rest Larvae) Comments - Not available

Environmental Associations (Resting Larvae) References - Not available

Environmental Associations (Pupa) Comments - Not available

Environmental Associations (Pupa) References - Not available

Environmental Associations (Egg) Comments - Not available

Environmental Associations (Egg) References - Not available

References [^](#)**References for (030061) Turtle, bog (= Muhlenberg) *Clemmys muhlenbergii***

- 3071 Arndt, R.G. 1977. Notes on the natural history of the bog turtle.us *Clemmys muhlenbergii*.us (Schoepff), in Delaware. Chesapeake Sci. 18(1):67-76.
- 3072 Barton, A.J., J.W. Price. 1955. Our knowledge of the bog turtle.us *Clemmys muhlenbergii*.us surveyed and documented. Copeia 1955(3):159-165.
- 11394 Carter, Shawn L., Carola A. Haas, Joseph C. Mitchell. 1999. Home Range and Habitat Selection of Bog Turtles in Southwestern Virginia. J. of Wildl. Manage. 63(3):853-860.
- 883 Conant, R. 1975. A field guide to reptiles and amphibians of Eastern and Central North America. Houghton Mifflin Co., Boston, MA: 429.
- 3074 Ernst, C.H. 1977. Biological notes on the bog turtle. Herpetological 33(2):241-

246.

- 3075 Ernst, C.H., R.B. Bury. 1977. *Clemmys muhlenbergi* (Schoepff). Catalog American amphibians and reptiles:204-1-204-.
- 2988 Ernst, C.H., R.W. Barbour. 1972. *Turtles of the United States*. Univ. Press of Kentucky, Lexington: 347.
- 1012 Gourley, E.V. 1979. Bog turtle from the Proceedings of the Symposium on Endangered and Threatened Plants and Animals of Virginia. Linzey, D.W. Ext. Div., VA Tech, Blacksburg, VA:405-406, 665 pp.
- 3076 Holub, R.J. 1977. The bog turtle *Clemmys muhlenbergi* - a natural history. Herpetol. Bull. New York Soc. 13(3):9-23.
- 10760 Mitchell, J. C. 1994. *The reptiles of Virginia*. Smithsonian Institution Press, Washington, DC: 352.
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- 8895 Mitchell, J. C., Pague, C. A. 1987. A review of reptiles of special concern in Virginia. Va. Jour. Sci. 38(4):319-328.
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- 11332 Mitchell, Joseph C. and Karen K. Reay. 1999. *Atlas of Amphibians and Reptiles in Virginia*. (1). Virginia Department of Game and Inland Fisheries, Richmond, VA: 122.
- 3079 Nemuras, K.T., Weaver, J.A. 1974. The bog turtle. Pennsylvania Angler (73):15-18.
- 11613 Pinder, M. 2001. Personal Communication, Expert Review for GAP Analysis Project. , Va. Dept. of Game & Inland Fisheries.
- 11048 Roble, S. M. 1996. Natural Heritage resources of Virginia: Rare animal species. Natural Heritage technical report 96-11. DCR, Division of Natural Heritage, Richmond, VA: 25.
- 3068 Shiffer, C.N. 1980. Personal communication. Herp. and endangered species coordinator. Pennsylvania Fish Commission, Bellefonte.
- 10120 Terwilliger, K. 1991. Virginia's endangered species: Proceedings of a symposium.: 672.
- 9286 Terwilliger, K.T. 1991. Virginia's endangered species: Proceedings of a symposium. Coordinated by the Virginia Dept. of Game and Inland Fisheries, Nongame and Endangered Species Program. McDonald and Woodward Publ. Comp., Blacksburg, VA: 672 pp.
- 11286 U.S. Fish and Wildlife Service. 1975. CITES - Convention on International Trade in Endangered Species of Wild Fauna and Flora - CFR 50 Part 23. U.S. Gov't Printing Office, Washington, DC.
- 11200 U.S. Fish and Wildlife Service. 1997. Endangered and threatened wildlife and

plants; Proposed rule to list the northern population of the bog turtle as threatened and the southern population as threatened due to similarity of appearance, Federal Register 50 CFR Part 17. 62(19). U.S. Government Printing Office, Washington, DC:4229-4239.

- 11279 U.S. Fish and Wildlife Service. 1997. Federal Register, November 4, 1997, Final rule listing the northern population of the bog turtle as threatened and the southern population as threatened by similarity of appearance, 50 CFR Part 17. Federal Register 62(213). U.S. Gov't Printing Office, Washington, DC:59605-59623.
- 11197 U.S. Fish and Wildlife Service. 1997. U.S. Fish and Wildlife Service proposes Endangered Species Act protection for bog turtle - Northeast Region press release mailed to public officials in Virginia.: 11 pp.
- 10949 Virginia Department of Game and Inland Fisheries. 1995. Collections database.
- 11349 Weigl, Peter D., Steele, Michael A., Sherman, Lori J., Ha, James c., Sharpe, Terry C. 1988. The Ecology of the Fox Squirrel (*Sciurus niger*) in North Carolina: Implications for Survival in the Southeast.: 133.
- 3081 Zappalorti, R.T. 1976. The amateur zoologist's guide to turtles and crocodilians. Stackpole Books, Harrisburg, Pa: 208.

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